Alberta Health

Tick Surveillance

2013 Summary

June 2014

Alberta Government

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Introduction

There are many species of ticks native to Alberta; these species are not considered vectors for transmitting the bacteria that causes Lyme disease (*Borrelia burgdorferi* sensu stricto)[1]. *Ixodes* species ticks (excluding *I. kingi)* are capable of carrying and transmitting *B. burgdorferi*[2]. The range of *I. scapularis* ticks has been expanding recently such that there are areas where they are now considered endemic in Southern Manitoba, Southern and Eastern Ontario, Southern Quebec and in the Maritimes[2]. Alberta has regularly found *I. scapularis* ticks in fairly small numbers in the province but, so far, they are considered an adventitious population. This means they are present due to incursions on migratory birds and other animals but do not survive over winter and reproduce.

In 2007, Alberta Agriculture and Rural Development (ARD) began a tick surveillance program for ticks on companion animals (e.g. pet dogs) in collaboration with veterinarians in the province. In 2013, the Alberta Arthropod-Borne Diseases Committee, in collaboration with ARD, Alberta Health, and Alberta Health Services, expanded the surveillance program to accept submissions of ticks found on humans or in the environment. ARD conducts the laboratory analysis on all* submitted ticks and manages the companion animal program. ARD is the foundation of the Enhanced Tick Surveillance Program.

The Enhanced Tick Surveillance Program's goal is to assess the risk of Lyme disease in Alberta. Passive tick surveillance is one step leading to and guiding active surveillance activities, which began in the fall of 2013. The enhanced passive surveillance system is expected to detect both established and adventitious populations; the active surveillance component will help differentiate between them. Together these surveillance activities will help Alberta to identify if there is emergence and establishment of ticks that can carry the agent that causes Lyme disease in humans. This will help determine the level and geographical distribution of risk to Albertans if or when they establish themselves in the province in the years to come.

Key Findings

- Of 960 total submissions, 105 *Ixodes*** ticks were submitted by Alberta resident humans and animals with no travel history.
- 21 out of 105 (20 per cent) were positive for *B. burgdorferi*. Only one was found on a human.
- *Ixodes* were found in all health zones; 72 out of 105 (69 per cent) in Edmonton Zone.
- Surveillance information continues to be collected and analysis is ongoing to determine when and where to conduct targeted active surveillance in the future.

*ARD does not analyze clinical samples submitted by physicians. Such samples are sent to the Provincial Laboratory for Public Health (ProvLab).
** *Ixodes* species excluding *Ixodes kingi*. *I. kingi* are not considered vectors for *Borrelia burgdorferi*.

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Results

In 2013, the Tick Passive Surveillance Program analyzed 960 ticks, 926 of which were from Alberta residents (human and animal) (Table 1). Ticks submitted by visitors to Alberta or Alberta residents who had travelled* in the previous two weeks were excluded from the main analysis, as it would be impossible to determine where they had acquired the tick given the geographical information available.

Table 1: All Ticks Collected from Companion Animals, Humans and the Environment Regardless of Residency and Travel History, 2013.**

	All Ticks	*Ixodes spp*		*Ixodes spp Borrelia burgdorferi* positive	
	N	N	%	N	%
North	112	20	18%	5	25%
Edmonton	278	106	38%	16	15%
Central	141	21	15%	4	19%
Calgary	299	20	7%		
South	96	4	4%	2	50%
Unknown/ Out of Province	34		0%		
Total	960	171	18%	27	16%

105 *Ixodes* species** ticks were submitted by Alberta residents who had not travelled in the previous two weeks (Tables 2-4). The majority of *Ixodes* ticks were submitted by individuals who resided in Edmonton Zone (54 per cent). Twenty per cent of *Ixodes* ticks tested were infected with *B. burgdorferi*, the causative agent of Lyme disease. Importantly, all *Ixodes* ticks submitted were adults. While active surveillance would be necessary to confirm, the collection of nymphs or larva would suggest a possible over-wintering population of *Ixodes*.

Table 2: Ticks Collected from Alberta Resident Humans and Animals with No History of Travel in the Previous Two Weeks, 2013.

	All Ticks	*Ixodes spp*		*Ixodes spp Borrelia burgdorferi* positive	
	N	N	%	N	%
North	64	16	25	4	25
Edmonton	133	72	54	13	18
Central	47	9	19	2	22
Calgary	89	5	6	0	-
South	45	3	7	2	67
Total	378	105	28	21	20

* Hosts were considered to have travelled if they answered "Yes" to one of the following questions: Humans: "Did the human travel outside of town in the last two weeks?" Animals: "Out of town in the last 2 weeks?"

** Note: This program is based on a convenience sample of submissions from volunteers. Therefore the number of ticks analyzed per zone does not necessarily correspond to the prevalence of ticks in a zone.

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Table 3: Ticks Collected from Alberta Resident Humans with No History of Travel in the Previous Two Weeks, 2013.

	All Ticks	*Ixodes spp*		*Ixodes spp Borrelia burgdorferi* positive	
	N	N	%	N	%
North	7	0	-	-	-
Edmonton	7	3	43	1	33
Central	8	0	-	-	-
Calgary	34	0	-	-	-
South	29	0	-	-	-
Total	85	3	4	1	33

Table 4: Ticks Collected from Alberta Resident Animals with No History of Travel in the Previous Two Weeks, 2013.

	All Ticks	*Ixodes spp*		*Ixodes spp Borrelia burgdorferi* positive	
	N	N	%	N	%
North	57	16	28	4	25
Edmonton	126	69	55	12	17
Central	39	9	23	2	22
Calgary	55	5	9	0	-
South	16	3	19	2	67
Total	293	102	35	20	20

Residential postal codes of the humans and animals who submitted the 105 *Ixodes* ticks were mapped to show the geographic distribution and assist in selecting sites for active surveillance (Figure 1 and 2). Potential sites for active surveillance were identified based on visual clustering of residential postal codes in proximity to an area that could be considered suitable habitat for ticks (i.e. a natural area with mixed forest and grasslands).

Conclusion

The Enhanced Tick Surveillance Program has identified *I. scapularis* ticks in Alberta, some of which were positive for the bacteria that can cause Lyme disease, *B. burgdorferi*. While the establishment of *I. scapularis* ticks in Alberta is not believed to have occurred yet, it is currently impossible to confirm if the ticks submitted are sporadic and carried here on migratory birds or if they are part of an established population capable of overwintering. Ongoing passive surveillance and the results of the active surveillance activities scheduled for Spring 2014 will provide more information.

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Figure 1: Residential Postal Codes of Alberta Resident Humans and Animals from which *Ixodes* Species Ticks Were Recovered and Who Had No History of Travel in Previous Two Weeks, Alberta 2013.

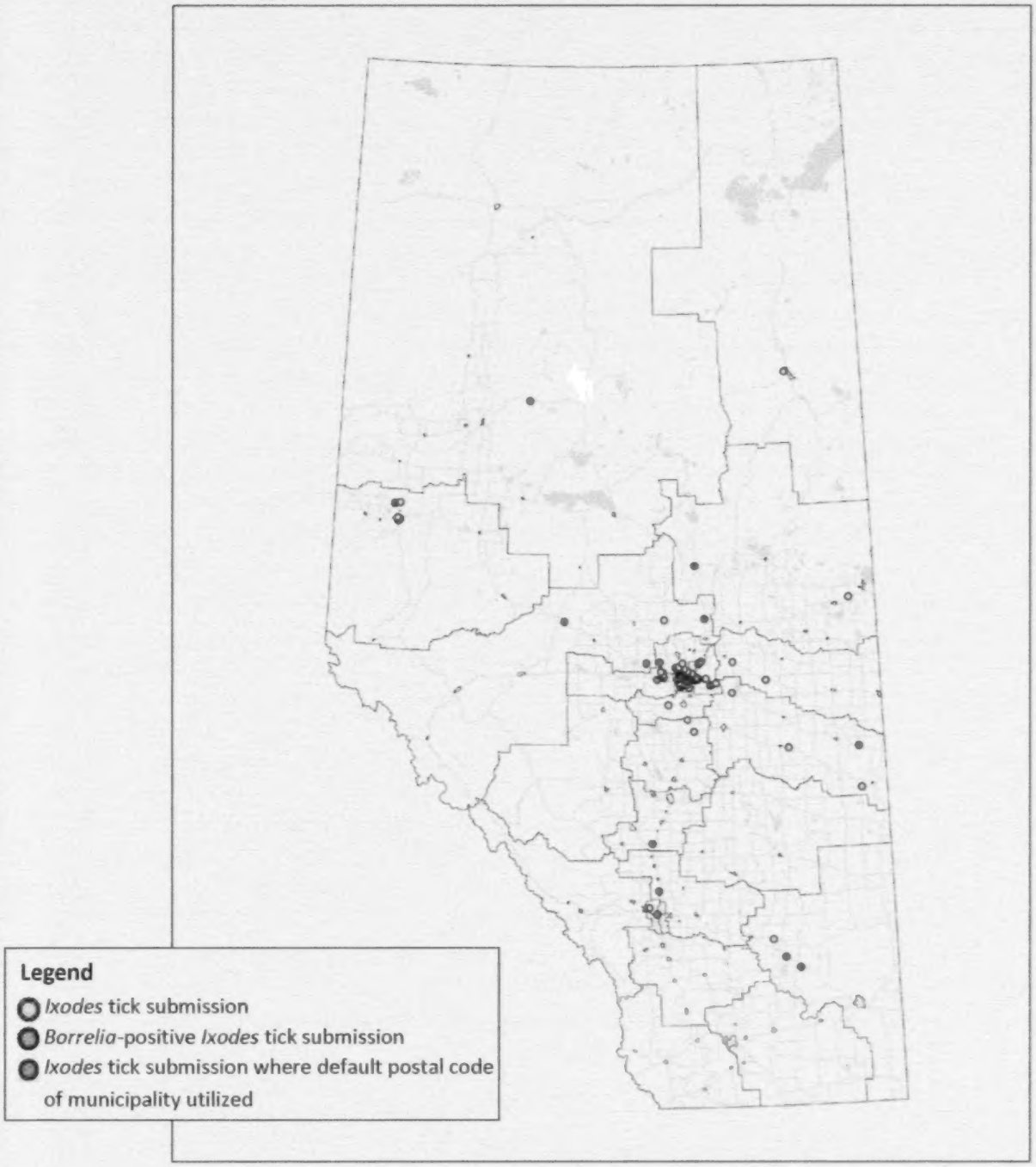
Legend
Ixodes tick submission
Borrelia-positive Ixodes tick submission
Ixodes tick submission where default postal code of municipality utilized

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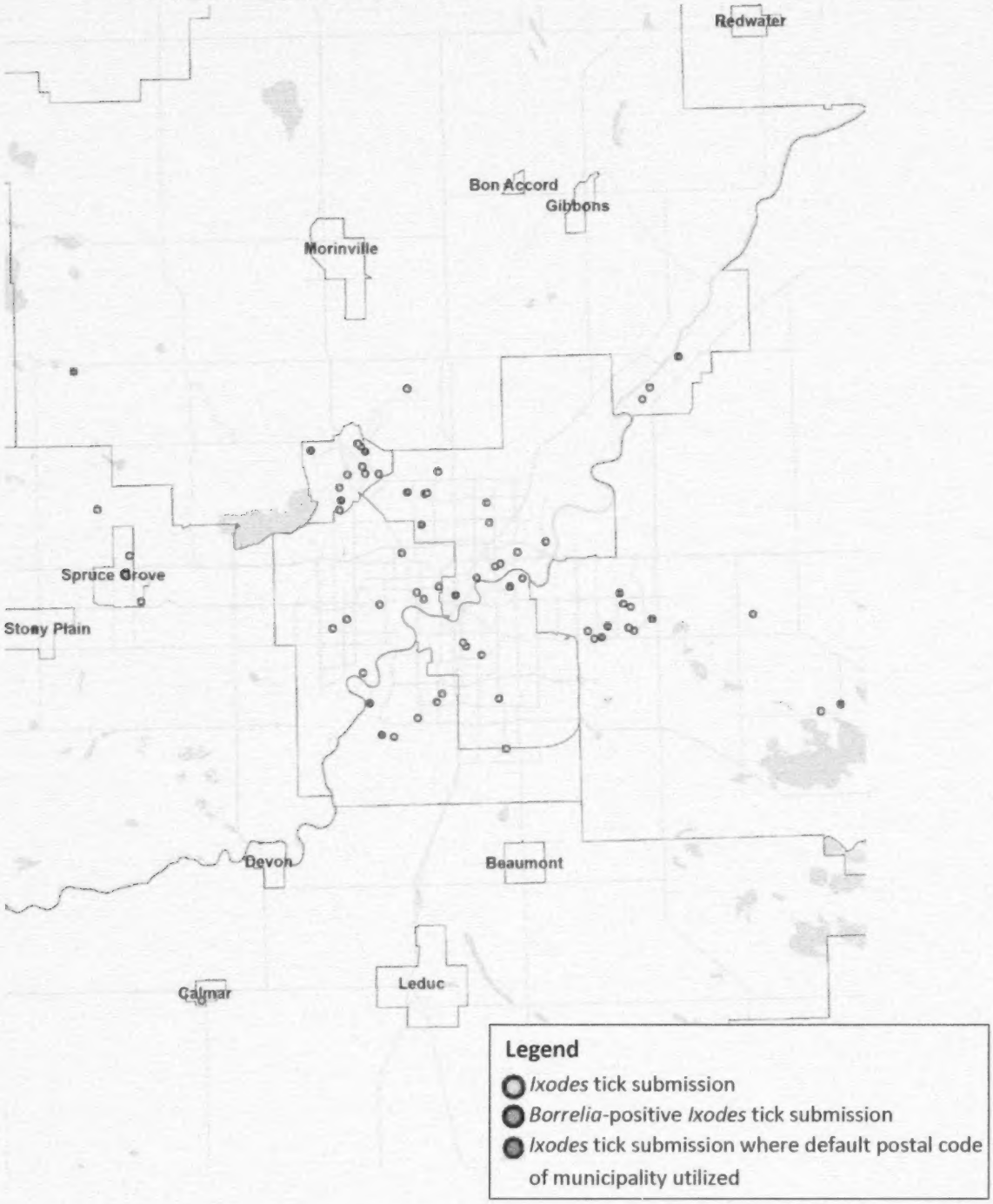
Figure 2: Residential Postal Codes of Alberta Resident Humans and Animals from which *Ixodes* Species Ticks Were Recovered and Who Had No History of Travel in Previous Two Weeks, Edmonton Zone 2013.



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1. Fitzgerald DT. *The species composition and distribution of Ixodidae from companion animals in Alberta, Canada.* Master's Thesis. University of Alberta. Edmonton, Alberta, 2012.
2. Ogden NH, Koffi JK, Pelcat Y, Lindsay LR. Environmental risk from Lyme disease in central and eastern Canada: a summary of recent surveillance information. *Can Comm Dis Rep* 2014; 40: 74 – 82.

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